APPRAISAL REPORT
Northampton, Massachusetts
Connecticut River

Local Flood Protection

October 1985

US Army Corps
of Engineers
New England Division

APPRAISAL REPORT
LOCAL PROTECTION PROJECT
NORTHAMPTON, MASSACHUSETTS

APPRAISAL REPORT
LOCAL PROTECTION PROJECT
NORTHAMPTON, MASSACHUSETTS

I. INTRODUCTION

A. Background

The city of Northampton, Hampshire County, Massachusetts is located along the Connecticut River at its confluence with the tributary Mill River. The mouth of the Connecticut River is about 94 miles downstream from Northampton's Oxbow Lake. The Northampton Local Protection Project (LPP) is a unit in the comprehensive flood protection plan for the Connecticut River Basin authorized by the 1938 Flood Control Act and modified by the 1941 Flood Control Act.

B. Authority

This study was accomplished under authority derived from EC 11-2-147 which provides direction to review the adequacy of completed LPP's which were specifically authorized by Congress. Development in watershed areas and new information on basin hydrology since the project's construction may warrant an updated analysis of the degree of protection being realized. The objective is to determine whether it is advisable to modify the structure due to changes either in the area being protected or to make changes to the project to improve its viability, safety, and reliability.

C. Purpose and Scope

The purpose of this investigation is to assess and document the adequacy of the existing LPP on the Connecticut and Mill Rivers through Northampton, Massachusetts, and determine if modification is advisable and warrants further Federal study.

The study process is divided into two phases - reconnaissance and feasibility. In reconnaissance, modifications to the project are screened from the standpoints of economic, environmental, engineering integrity, and safety considerations. The detail used is strictly at the level of initial appraisal. Items of local cooperation, both past and future, are addressed when an affirmative action is recommended.

If warranted, the feasiblity phase would detail the actual modification alternatives and recommend a particular course of action. The recommendation would be based on a comparison of each alternative's expected accomplishments.

The scope of this particular report is of a reconnaissance nature. The objectives are:

- Compile existing information
- Establish the need for modification
- Identify modification opportunities
- Determine preliminary feasibility of modifications
- Recommend future course(s) of action

D. Public Coordination

On 28 March 1985 personnel from the New England Division (NED) visited the project and the areas being protected. Discussions with the city's Planning Director were held regarding any future plans for the areas currently afforded flood protection and other sections of the city in the floodplain.

E. Other Studies

Beginning in the 1930's the Connecticut River's flood problems became the subject of much study, most of it by the Corps of Engineers. There have been over 25 in-depth reports prepared as a result of Congressional directives and authorizations. In addition, a multi-agency Coordinating Committee issued their "Comprehensive Water and Related Land Resources Investigation" in June 1970, which prompted two reports by the New England River Basins Commission (NERBC): their 1976 "The River's Reach, A Unified Program for Flood Plain Management in the Connecticut River Basin" and the 1980 "Connecticut River Basin Plan."

The most recent semi-annual inspection of the LPP was conducted on 15 May 1985. The project is in satisfactory condition and capable of performing its intended function. However, there are two deficiencies, described in more detail later, which require remedial action.

NED completed a feasibility study of nonstructural flood damage reduction measures for Northampton in January 1981. The plans developed dealt, for the most part, with minimizing potential future flood damage since Northampton's floodplain is largely undeveloped. Recommendations focused on controlling floodplain development. Only a few structures were found eligible for cost effective nonstructural flood protection.

NERBC's "River's Reach" examined many alternatives and approaches to solving the flood problem. One of these was raising the existing LPP's along the Connecticut to provide more protection. In addition, NERBC recommended that investigation of nonstructural measures be undertaken.

The Federal Emergency Management Agency's (FEMA) Flood Insurance Study (FIS) became effective November 1976 when the city of Northampton joined the regular portion of the National Flood Insurance Program.

II. EXISTING CONDITIONS

A. Project Area

1. Description

The city of Northampton, Massachusetts is located on the west bank of the Connecticut River, 90 miles west of Boston and approximately 15 miles north of Springfield, Massachusetts. It is bordered by Williamsburg and Hatfield on the north, Westhampton to the west, and Easthampton to the south. The terrain is generally hilly, with elevations ranging from ,200 feet NGVD in the central section to 800 feet NGVD along the western edge of the city. The area along the Connecticut River to the east is fairly level with a wide floodplain. The flood plains of Northampton are part of an 8,500-acre natural valley storage area in Massachusetts that extends from Montague City to Holyoke. Most of Northampton's development is along the Mill River which flows in a southeasterly direction through the center of the city to its confluence with the Connecticut River at Oxbow Lake.

Since the project's construction there has been little change in the intensity of floodplain use. Of the almost 23,000 acres of land in Northampton, approximately 16,500 acres are undeveloped including 3,700 within floodplain areas. In addition, there has not been any significant new development to the properties currently offerred flood protection by the LPP. The Connecticut River floodplain in Northampton includes roughly 3,300 acres of open ground, about 2,000 of which is farmland. Still there exists a number of commercial-industrial establishments which would sustain damage in the event of a severe flood. The existing LPP would protect the central portion of the city, but some homes in the area of the fair grounds and along Island Road at Oxbow Lake would also experience flood damage.

2. Hydrology and Hydraulics

The average annual precipitation over the basin is approximately 43 inches, and varies from about 36 inches along the Connecticut River valley to more than 60 inches in the White and Green Mountains. The annual precipitation in the Northampton area is 44 inches.

Precipitation in the northern half of the basin during the winter months is practically all in the form of snow; in the southern areas alternate periods of snow and rain can be expected. The snowfall varies from an average of less than 40 inches annually at the lower elevations in Connecticut to well over 100 inches in the northern and mountainous areas of the basin.

Early spring thaws usually diminish the snow cover in the lower elevations of Massachusetts and Connecticut before melting takes place in the higher elevations or northern areas of New Hampshire and Vermont.

Water content of the snow in the mountains often reaches 6 to 10 inches. The water content in the snowpack usually reaches a maximum about the middle of March.

The average annual runoff for the basin is about 23 inches or slightly over one-half the average annual precipitation. The annual runoff follows a pattern somewhat similar to the annual precipitation in that it varies from about 17 inches in the areas of lowest elevation in the main river valley north of the Massachusetts State line, to more than 40 inches in the highest elevations of the White and Green Mountains. About 50 percent of the annual runoff in the central and northern portions of the watershed occurs in the spring months of March, April and May. Runoff in the lower basin during the same months, as a result of less snow accumulation, is about 40 percent of the annual.

A summary of drainage area-peak discharge relationships for the two rivers are shown below.

Table 2
Summary of Discharges
Northampton, Massachusetts

Flood Source	Drainage Area (sq. miles)	Length (Miles)	Peak Discharges Annual Chance of Occurence 10% (CFS)	2% (CFS)	1% (CFS)	0.2% (CFS)
Connecticut River	8,109	303.7	112,000	158,000	180,000	242,000
Mill River	54	16.4	4,700	8,400	10,600	16,000

3. History of Floods

The Northampton residents are very familiar with the flood threat posed by the Connecticut and Mill Rivers. As early as 1692 there is mention of flood damage due to high stages on the Connecticut River. A paper written in 1928 describes what were then the 10 greatest Connecticut floods on record at Northampton. These included the "Jefferson Flood" on 20 March 1801; a flood on 5 February 1840 that cut the present river channel east of the Oxbow in Northampton; the "Lincoln Flood" on 20 April 1862; the "Pumpkin Flood" of 6 October 1869; and, lastly, the record to that date, the 5 November 1927 flood. There is also discussion of a flood on the Mill River in 1874, when, following the failure of a small industrial water storage reservoir near Williamsburg about 7 miles northwest of Northampton, 143 lives were lost and more than one million dollars in damages was caused. It is clear that floods were part of life throughout Northampton's developing years.

Records of river height are continuous on the Connecticut River at Montague City, Massachusetts, since 1904 and on the Mill River at Northampton since 1938. The flood of record on the Connecticut River at

Northampton is the March 1936 event, while the hurricane-spawned 1938 flood is the record on the Mill River. Both caused extensive damage to the center of Northampton; and, as a result, the 1938 Flood Control Act authorized the construction of the LPP. If these historical floods were to recur today, stages on the Connecticut River would be considerably lower because of the operation of the system of flood storage reservoirs upstream in the basin. This is not the case with the Mill River, however, as flood impoundments have not been built on that stream.

Since 1938 additional flooding on both streams has caused limited damage. Floods in 1949, 1955, 1960, 1973, 1983 and 1984 resulted in some economic losses on agricultural lands in the city. However,flooding may occur in the basin during any time of the year, resulting from excessive rainfall, snowmelt or a combination of both. In the spring months, flooding is usually associated with snowmelt throughout the basin, resulting in prolonged high stages on the main stem and a large volume of runoff. The floods in 1936, 1949, and 1960 were of this type. The fall floods in 1927 and 1938 and the summer floods of August 1955 resulted from intense rainfall. Table 3 below summarizes flood data at a gaging station just upstream of Northampton.

Table 2
FLOOD DATA
Connecticut River at
Montague City, Mass.
(DA = 7,865 sq. mi.)

Date	Peak Discharge (cfs)	River Depth (ft)
Mar 1936	236,000	49.2
Sep 1938	195,000	44.7
Nov 1927	179,000	-
Jun 1984	148,000	-
Apr 1960	142,000	38.1
Jan 1949	139,000	37.8
Dec 1983	86,000	-

B. Project Description

1. History

The Northampton local protection works, depicted in Enclosure 2, is located along the west bank of the Connecticut River in the city of Northampton, Massachusetts, and consists of earth dikes and a diversion canal for the Mill River to the Connecticut River via the Oxbow Lake. The Northampton LPP was built in sections starting in March 1939 and completed in June 1941. Construction costs for the project amounted to $960,000 in 1941 which involved non-Federal costs for lands, easements and right-of-ways amounting to $170,000.

In the eastern portion of Northampton the dike has a maximum height of 23 feet and is about 5,000 feet long, extending along the Connecticut River from high ground at Pomeroy Terrace across the bed of the Mill River to high ground west of U.S. Route 5. There is a pumping station located at the dike to remove any interior ponding when the Connecticut is at high river stages. There are stoplog structures where the dike crosses U.S. Route 5 and the Boston and Maine Railroad.

On the Mill River near South and West Streets, two sections of earth dike totalling about 1,900 feet in length, with a maximum height of 25 feet, surround a concrete floodwall approximately 450 feet long. This system diverts the Mill River into a 10,500-foot long diversion channel, which carries the river into Oxbow Lake. Also included is a drop structure and bridge, stoplog structures and street relocations.

2. Damages Prevented

The two most recent flooding events in Northampton occurred during December 1983 and May/June 1984. The combined effect of the system of nine Army Corps of Engineers flood control dams in the Connecticut River Basin above the city and LPP reduces high river stages and associated flood damages. In order to estimate the damages prevented (benefits) and attribute them to the dams and the LPP, a comparison is made of the observed flows of a flood event with the flood protection in place and the computed flows which would have occurred without the system of upstream reservoirs and the LPP in place. Table 3 indicates that total damages in Northampton for those two events without the flood protection would have been approximately $3,000,000. The Northampton LPP itself contributed to the prevention of about 12 percent of those damages. Since its completion in 1941, it is estimated that the LPP alone has prevented damages of nearly $2.5 million to date in Northampton.

Table 3
Connecticut River Basin
Damages Prevented Recently in Northampton, MA
(current price level)

Event	Observed Conditions (cfs)	Observed Conditions (Damages)	Computed No-Project Condition (cfs)	Computed No-Project Condition (Damages)	Damages Prevented Upstream Reservoirs	Damages Prevented Northampton LPP
May/ June 1984	148,000	$312,700	181,000	$2,829,400	$2,516,700	$312,700
Dec 1983	86,000	55,000	99,000	177,000	122,000	55,000
TOTALS		$367,700		$3,006,400	$2,638,700	$367,700

3. Level of Protection

Since the March 1936 flood, the Corps of Engineers has constructed an upstream system of dams and reservoirs which have modified the floods throughout the area. The recurring March 1936 flood on the Connecticut River ar Northampton, modified by the reservoir system, would have peak discharge of about 117,000 cfs compared to the experienced flow of 230,000 cfs.

The Northampton LPP provides protection against flood stages on the Connecticut and Mill Rivers. The design for the project is the Standard Project Flood (SPF), having flows of 230,000 cfs along the Connecticut River and 20,000 cfs along the Mill River. The project can protect against an event having an annual chance of occurrence between 1.0 and 0.5 percent (100 and 200-yr recurrence intervals).

The occurrence of an SPF, as currently modified by the existing Corps flood control dams, would come within a foot of overtopping the existing dike system at U.S. Route 5. Current design criteria calls for three feet of freeboard for dikes and two feet for walls.

4. Recent Inspection

The most recent semi-annual inspection was conducted on 15 May 1985. The project is in very good condition and capable of fulfilling its intended purpose. However, the condition of one of the pumping station engines needs attention. Pump engines #1 and #2 were tested and operated satisfactorily. Pump engine #3 was inoperable and in need of repair. The city's current budget includes $50,000 for the replacement of this engine with a diesel unit.

During the June 1984 flood, all operable pump engines were run 24 hours per day for approximately one week. If a malfunction occurred, the station would have been left with inadequate pumping capacity. The replacement of engine #3 would allow for the use of two engines with one engine cooling at all times, and provide backup capabilities in case of breakdown.

Finally, the extensive tree and brush growth along the Mill River has been cut. This is a marked improvement over the last several years. A contract has been let out to treat the cut areas with a herbicide to inhibit future growth. Also silt deposits downstream of the South Street drop structure should be removed.

III. Future Conditions

A. Floodplain Development

1. Land Use

The flood of record on the Connecticut River at Northampton in March, 1936 and the 1938 hurricane flood on the Mill River caused extensive damage to the center of Northampton. A recurrence of an event equal to the 1936 flood on the Connecticut River would cause approximately $758,000 (1938 price level) in flood damages in the protected area if the LPP was not in place. At the 1985 price level these damages would amount to about $9.8 million.

Table 4 demonstrates that the Northampton LPP was expected to reduce total damages in the study area by 36 percent in the event of a recurrence of a flood equal to that of 1936. All of the damages sustained by the agricultural sector are outside of the protected area. Potential commercial and residential damages would be reduced by nearly one-half. Approximately one-third of the potential industrial damages would be eliminated.

Table 4
Northampton Local Protection Project
Flood Damages - Recurrence of Flood Equal to 1936 Flood
(prices at 1985 level)

	Total		Inside LPP	
	Damages ($1000)	Percentage	Damages ($1000)	Percentage
Commercial and Residential	12400	46.3	5700	58.2
Agriculture	3900	14.5	-	-
Industrial	4900	18.3	1500	15.3
Utilities	-	-	-	-
Highway	4700	17.5		26.5
R.R.	900	3.4	2600	
Total	26800	100.0	9800	100.0

There has not been a detailed review of changes in land use in the area protected by the LPP since the original damage survey. Only the updating of these damages for different years has been done.

In 1974, NED examined land use outside of the area protected by the LPP, which is primarily agriculture. Some clearance of damaged commercial and residential properties had taken place subsequent to the 1936 flood. However, most damaged residences were removed later to make way for a new section of Route 5.

A cursory field review of land use in 1985 indicated the adequacy of the existing LPP for the protection of its target properties. With respect to areas outside of the LPP, this land remains primarily agricultural. Some very limited development of single and duplex housing has, however, taken place.

The SPF flood plain contains roughly 3,300 acres of mostly farm land. However, there are several residential, commercial and industrial structures which would sustain some damage in the such an event. These include properties mostly constructed within the past 15 years:

- an asphalt plant and portions of a garden apartment development off Damon Road near Elwell Island.
- the three-county fairgrounds and Lafleur airport in the vicinity of Routes 9 and I-91.
- the Colonial Hilton Inn at the intersection of Routes I-91 and Route 5, and the Tri-City Container Plant off Route 5, at the Oxbow Lake.
- some residences in the area of the fairgrounds and along Island Road at Oxbow Lake.

The potential flood threat posed by the Mill River is more difficult to evaluate due to its "flashy" nature. Existing local protection works will adequately protect the central portion of the city. Yet, the potential for flooding and subsequent damages still exists in the area of Paradise Pond and the Look Park area of Florence.

Properties susceptible to flood damage from the Mill River include about 150 residences, commercial and industrial concerns, and recreation areas. Total damage in the event of an one percent annual chance flood (100-year) would amount to about $1.1 million. Some of the properties susceptible are:

- about 30 homes in Leeds, Look Memorial Park, the Mill River Plantation, some barns and tobacco sheds.
- in Florence, portions of the Pro-Brush Division of Vistron Corporation plant.
- 105 acres in the vicinity of Paradise Pond on the Smith College campus, including the Northampton High School field and some homes along Riverside Drive in the Bay State area.
- about 75 homes and 15 businesses in other reaches.

2. Community Plans

The city of Northampton, in its "Local Growth Policy Statement," prepared in July 1976, described a desired future. Its goals for future growth and development include: (1) improving the overall conditions of the city in terms of upgrading the schools and the sewer and water system; (2) improving the downtown area with new stores and a restoration and renovation of older buildings; (3) providing more facilities for leisure time activities; (4) developing and acquiring additional land for recreation and conservation purposes; (5) developing additional business in Northampton; (6) improving the overall quality of city development with the effective use of subdivision and zoning controls; (7) developing a sense of community pride among Northampton's citizens; and (8) improving transportation.

Most of the land in the Connecticut River flood plain was rezoned into a special conservancy zone (SC). This zone allows only agricultural uses and, with special provisions, a few structural uses. The SC zone is one step towards the city's goal of keeping as much flood plain land as possible in agricultural or open space use.

Since the Mill River flood plain is already developed, it required a different type of zoning control. The city created a watershed protection district (WPD) overlay that maintains the existing zone but adds a set of flood-proofing requirements for future site development. For developed areas in the Connecticut River floodplain, the WPD provides a mechanism for controlling future growth.

Both the WPD and the SC zones have provided the city not only with a reasonable means for protecting the flood plain from future intensive development but also with a means for flood-proofing what development does occur. For example, no homes or businesses have been constructed in Northampton's flood plain since 1974 nor have any been substantially improved. Substantial industrial or commercial development in the Northampton flood plain is not expected.

In summary, Northampton's growth has stabilized. No events that would result in large increases in population or significant changes in land use patterns are anticipated. Therefore, little development pressure on flood-prone areas is expected, other than identified here. With continued restriction on flood plain development, other areas in Northampton would maintain greater appeal for development. The city is expected to continue efforts to preserve flood plain areas and regulation as provided in their zoning ordinances and further reinforced by their participation in the National Flood Insurance Program (NFIP).

3. Economics

The flood plains associated with a 100-year event on the Connecticut and Mill Rivers in Northampton number approximately 3,700 acres. Data prepared in 1978 by the New England Division indicates that flood losses to development in the 100-year flood plain of the Connecticut within Northampton would amount to over $12 million in such an event, with 80 percent to commercial and industrial property alone. Additionally, such losses would include damages valued at $1.4 million to residential property and over $1 million to farms. An estimated 75 homes, 1 industrial structure and 9 commercial establishments would be affected. In addition, transportation would be disrupted because Route 5 and many local streets would be inundated. Public health would be jeopardized if the sewer treatment plant outfall were totally submerged. Allowing for inflation, these 1978 estimates would be nearly 50% higher at today's prices.

Along the Mill River flood plain, which is not as extensive as the Connecticut, the potential flood loss estimated in 1978 for the 100-year event was approximately $437,000---with losses to industry valued at $7,900; to institutions, $338,000; and to residences, $91,000. The losses would involve eight homes, four industries and three public uses. Total potential flood damage would approach $660,000 at 1985 price levels.

The total average annual flood losses are $255,000. Of this amount, $212,000 would occur along the Connecticut River and $43,000 along the Mill River.

B. Project Integrity

The existing LPP has performed the intended purpose over its life to date. With appropriate operation and maintenance, the project should be able to continue providing protection as designed. However, as the semi-annual inspection report indicates, the project's pumping station needs attention. Without the safe function of all pumps during storm events, ponding within the protected area could be extensive and cause flood damages. This would defeat the project's purpose.

IV. CURRENT PLANNING AND DESIGN CRITERIA

A. Freeboard

1. Requirements

There are no specified criteria with regard to the design level of protection for flood damage reduction projects. Each project should be complete within itself and provide the maximum net benefits, unless there is overwhelming justification to deviate. In urban areas the Standard Project Flood (SPF) is a design goal since potential overtopping or failure could be catastrophic. An SPF's chance of annual occurence varies regionally, but could be as frequent as an event having a 0.5 percent annual chance.

Engineering regulations call for freeboard allowances above design grade of 2 feet for concrete walls and 3 feet for dike or levee systems. The Northampton LPP does not conform to this criteria. An SPF would come within a foot of overtopping the dike at U.S. Route 5.

2. Benefits

Current planning guidance allows for taking credit for expected benefits within the bottom half of the freeboard range. In the case of the Northampton LPP, any expected benefits are considered insignificant because of the low intensity of development in the project's protected area and the minimal amount of freeboard actually present.

EM 1120-2-104 outlines the procedures regarding benefits for advance replacement of existing projects and features. A credit can be taken for extending the life of a project or feature and realizing benefits beyond which it would have continued to function. Since the Northampton LPP is 44 years old, and near the end of its economic life, any modifications that extends its physical life may take advance replacement benefits. However, an engineering analysis of the structure's stability and integrity would have to be accomplished to determine just how much longer the LPP can be expected to perform its intended purpose, since advance replacement benefits can only be attributed for the period of time after the structure would naturally be unable to provide flood protection. This study does not address this issue.

V. MODIFICATION OPPORTUNITIES

A. Level of Protection

In 1976, the New England River Basins Commission (NERBC) reported in the River's Reach on the feasibility of raising the Northampton LPP. Protection up to the SPF was examined by raising the concrete flood wall and earth dike by 3.6 feet. This was estimated to cost approximately $2 million at 1974 price levels, with a benefit-cost ratio of just 0.7. Today it would cost over $5 million. Although the city of Northampton and the Commonwealth expressed an interest in the feasibilty studies back in 1976, the cost clearly outweighed the potential benefits and precluded modifications. A recent inspection of the protected area did not find any changes in this potential benefit to cost relationship.

Channel improvements, diversions and watershed treatment were found to be impracticable for the flooding problem in Northampton. Due to hydraulic conditions, topography, stream slope, and the depth and velocity of flooding, these measures were not technically feasible.

B. Protected Area

The city seems committed to keeping as much flood plain land as possible in agricultural or open space use. For the most part, this objective has met little resistance. Inspection of the flood plain indicates extension of the protection to these areas is not needed at this time.

C. Project Features

The feasibility of using a levee located between I-91 and the existing dike was examined. Under this plan the I-91 embankment would be used as a levee and stop log structures would then be used to close any openings. The total cost for this measure was estimated to be $1.7 million in 1976. This measure was found to be not economically feasible, with a benefit-cost ratio of 0.6.

VI. CONCLUSIONS

An increased level of flood protection or extension of the protected area at the Northampton LPP is not needed at this time. The project itself is in good condition and expected to continue to perform its intended purpose.

Pump engine #3 in the pumping station should be replaced as soon as possible. The city of Northampton has indicated funds are now available for that purpose.

VII. RECOMMENDATIONS

Modifications to increase the level and extent of flood protection at the Northampton LPP are not recommended at this time. However, due to the age of the project, another review in acordance with EC 11-2-147 should be scheduled. The Northampton LPP will be 50 years old in 1991. This would be an appropriate time for the next review.

It is recommended the city of Northampton replace pump engine #3 in the pumping station as soon as possible. The LPP's ability to provide the intended level of flood protection could be threatened if this situation is not corrected.

VIII. ENCLOSURES

June 3, 1985

Operations Division, Project Operations Branch

Honorable David D. Musante, Jr.
Mayor of the City of Northampton
City Hall
Northampton, Massachusetts 01060

Dear Mayor Musante:

My representatives conducted the annual inspection of the Federally built local flood protection project in Northampton on May 15, 1985. I have enclosed a detailed inspection report for your review.

The project is in very good condition. I was pleased to learn that the brush and tree growth on the stone slope protection along the Mill River has been cut. Mr. Stone stated that these areas will be treated with a herbicide. A regular herbicide treatment will eliminate the need for costly manual cutting.

I understand funds are available to purchase a replacement engine for the pumping station. We are available to assist you in sizing the engine and gear ratio according to your required pumping capacity.

I want to thank your Messrs. Sheehan, Stone and Lamoureux for their cooperation during the inspection. If you require any technical assistance in the operation and maintenance of your project, please call me at (617) 647-8411 or Mr. Joseph Ledgere, Lower Connecticut River Basin Manager, at (617) 249-2547.

Sincerely,

MOROCCO
MINIOR
WONG

J. C. WONG
Chief, Project Operations Branch

Enclosure
As stated

Copy Furnished:

Mr. Francis X. Sheehan
City Engineer
Dept. of Public Works
125 Locust Street
Northampton, Massachusetts 01060

Mr. Peter J. McNulty
Asst. Director of Public Works
125 Locust Street
Northampton, Massachusetts 01060

Basin Manager, LCRB

Connecticut River Valley Flood
Control Commission
46A Main Street
Greenfield, MA 01301

ENCLOSURE 1

LOCAL FLOOD PROTECTION PROJECT INSPECTION REPORT

Project: Northampton, MA

Maintaining Agency: Northampton DPW

Type Inspection: X Semi-Annual Staff ___ 90 Day Interim

River Basin: Connecticut Date of Inspection May 15, 1985

Feature	Sat	Unsat	Deficiencies
PUMPING STATIONS - STRUCTURES			
INTERIOR	X		
EXTERIOR	X		See Comment #1
PUMPS - MOTORS - ENGINES			
TRIAL OPERATED	X		
GENERAL CONDITION	X		
POWER SOURCE	X		
INSULATION TESTS			N/A
METAL INTAKES/OUTLETS	X		
GATE VALVES	X		
GATES - DRAINAGE STRUCTURES			
TRIAL OPERATED	X		
GENERAL CONDITION	X		
LUBRICATION	X		
DIKES - DAMS			
GENERAL CONDITION	X		See Comment #4
SLOPES/EROSION	X		
SAND BOILS/CAVING	X		
TRESPASSING	X		
SLOPE PROTECTION	X		See Comment #5
DRAINS	X		
STOP-LOGS - LOG BOOM			
CONDITION OF LOGS	X		
AVAILABILITY OF LOGS	X		
HIGHWAY SLOTS	X		
STORAGE FACILITIES	X		
CHANNELS - OUTLET WORKS CHANNEL			
BANKS	X		See Comment #5
OBSTRUCTION CONTROL	X		

NED FORM JAN. 66 513

Feature	Sat	Unsat	Deficiencies
CONCRETE STRUCTURES			
SURFACE	X		
SETTLEMENT	X		
JOINTS	X		
DRAINS	X		
MISCELLANEOUS			
EMERGENCY OPER. PLAN	X		
EMERGENCY EQUIPMENT	X		
SEMI-ANNUAL REPORT	X		Interim reports due February & August

Inspection Party:

Mr. Francis Sheehan, Asst. City Engineer, Northampton
Mr. Roland Lamoureux, Pumping Station Operator, Northampton
Mr. Joseph Johnson, Project Manager, Knightville Dam, CE
Mr. Jan Szwed, Basin Mgr. LCRB, CE
Mr. James Morocco, Operations Division, NED, CE
Mr. Richard Stone, Supt. of Streets, Northampton

Photographs Taken:

Remarks & Additional Comments:

(Indicate Here Observations, Discussions, Specific Feature Deficiencies, Recommendations and any other pertinent information. Use Continuation Sheet if necessary.)

See Attached Sheet

X ALL APPLICABLE ITEMS. IF UNSAT INDICATE SPECIFIC DEFICIENCIES. INDICATE IF NOT APPLICABLE.

DATE	INSPECTED BY: TYPED NAME & TITLE	SIGNATURE
4/21/75	JAMES A. MOROCCO, Civil Engineer	J. A. Morocco

Northampton LPP Inspection
May 15, 1985

Comment #1

a. The interior of the pump station is in excellent condition.
b. Parapet and roof repairs are complete, but the final inspection is yet to be performed.

Comment #2

a. Pump engines #1 and #2 were tested and operated satisfactorily.
b. Pump engine #3 is still down for repairs, however, it is virtually impossible to obtain repair parts, $50,000 has been included in the budget for engine replacement. Mr. Sheehan stated that he will contact us for technical advise on engine type, sizing, gear ratio, etc.
c. Electric volute pump is operational.
d. Four gate valves are operational; however, flap valves need to be lubricated and painted.
e. Generator was tested and is operational. Time 86.0 hours.
f. One of two exhause fans not operational.
g. Time on engines:

	Spring 84	Fall 84	Spring 85
#1	288.6	368.8 hours	369.9
#2	329.6	431.4 hours	433.8
#3	63.9	63.9 hours	63.9

h. A masonry crack on the riverside wall should be pressure grouted to prevent leakage.

Comment #3

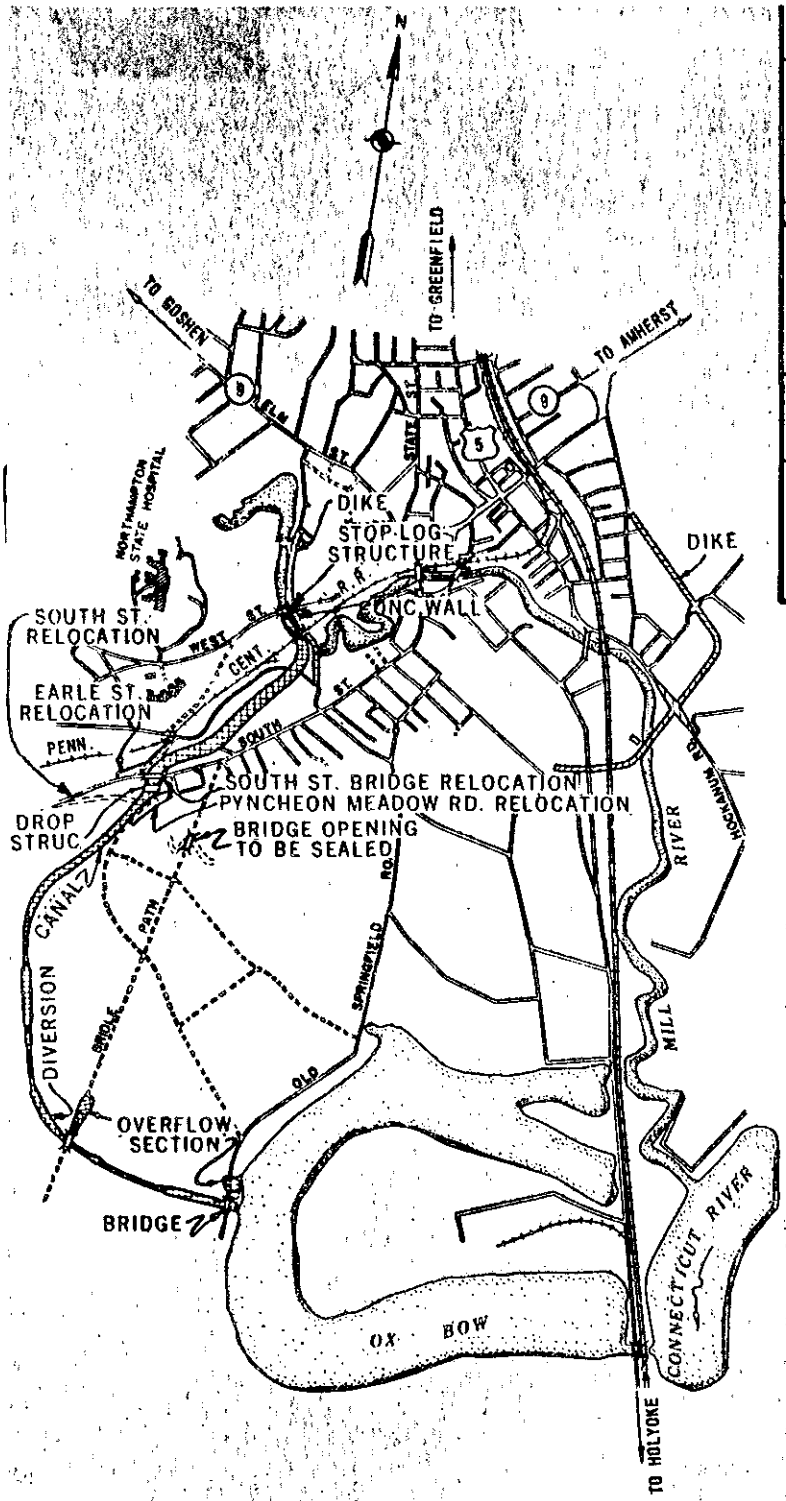
a. Intake sluice gates are operational.

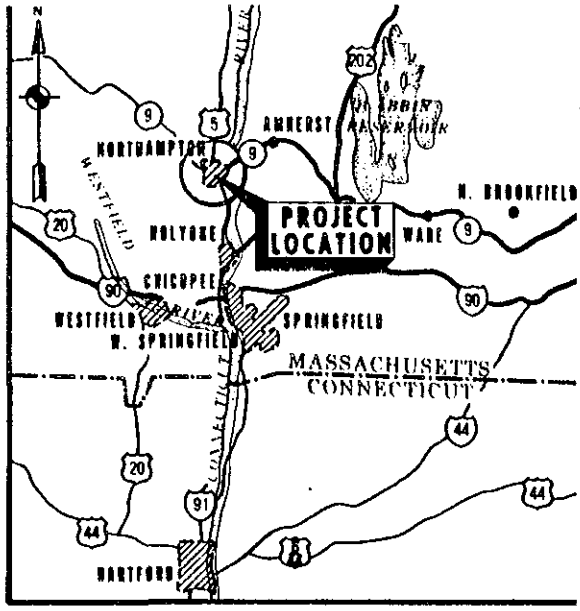
Comment #4

a. All dikes are in excellent condition. Mowing program for the dikes should continue.

Comment #5

a. The extensive tree and brush growth along the Mill River has been cut. This i a marked improvement over the last several years. A contact has been let out to treat the cut areas with a herbide to inhibit future growth.
b. Small trees adjacent to the floodwall at the pumping station should be cut.
c. Silt deposits downstream of the South Street drop structure should be removed.
d. Approximately 2500 sand bags should be purchased in case of emergency.





VICINITY MAP
SCALE IN MILES
0 2

CONNECTICUT RIVER FLOOD CONTROL

NORTHAMPTON, MASS.

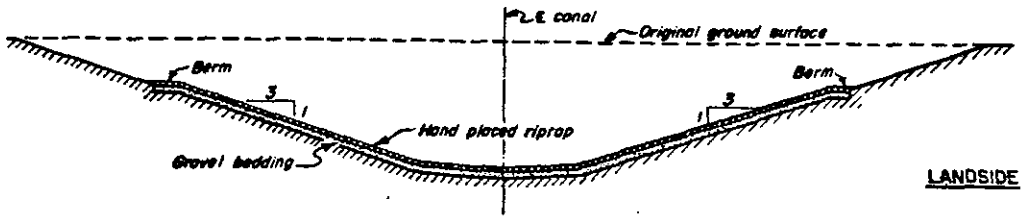
LOCAL PROTECTION PROJECT

GENERAL PLAN

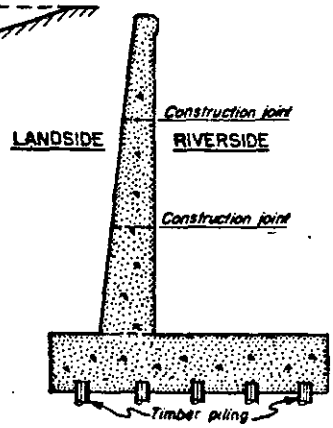
SCALE IN FEET
1500' 0 1500 3000'

NEW ENGLAND DIVISION WALTHAM, MASS.

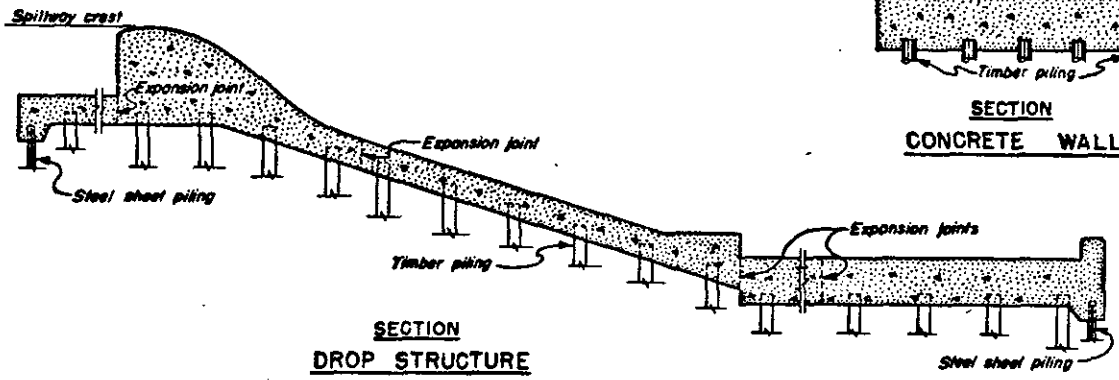
ENCLOSURE 2



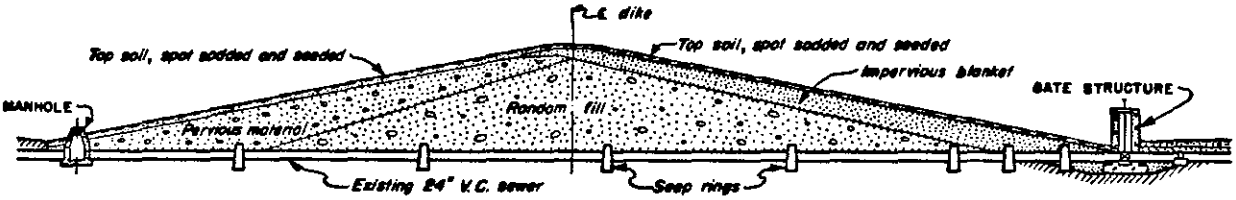
SECTION
DIVERSION CANAL



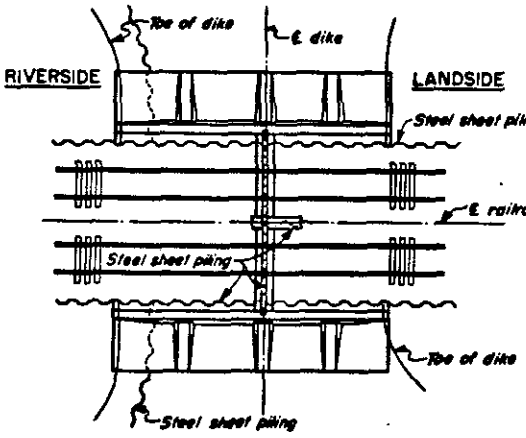
SECTION
CONCRETE WALL



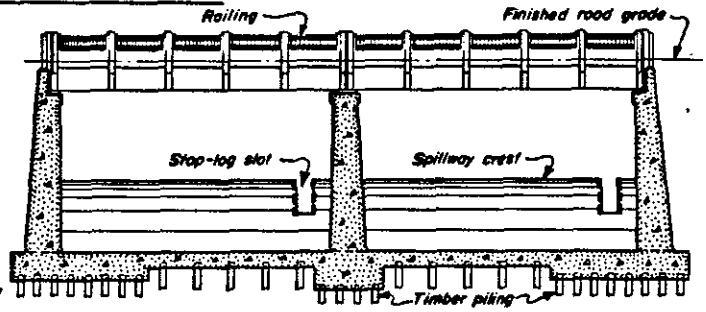
SECTION
DROP STRUCTURE



SECTION
DIKE AND DRAINAGE SYSTEM



PLAN
STOP-LOG STRUCTURE



ELEVATION
SOUTH ST. BRIDGE AND WEIR CREST

CONNECTICUT RIVER BASIN

NORTHAMPTON, MASS.

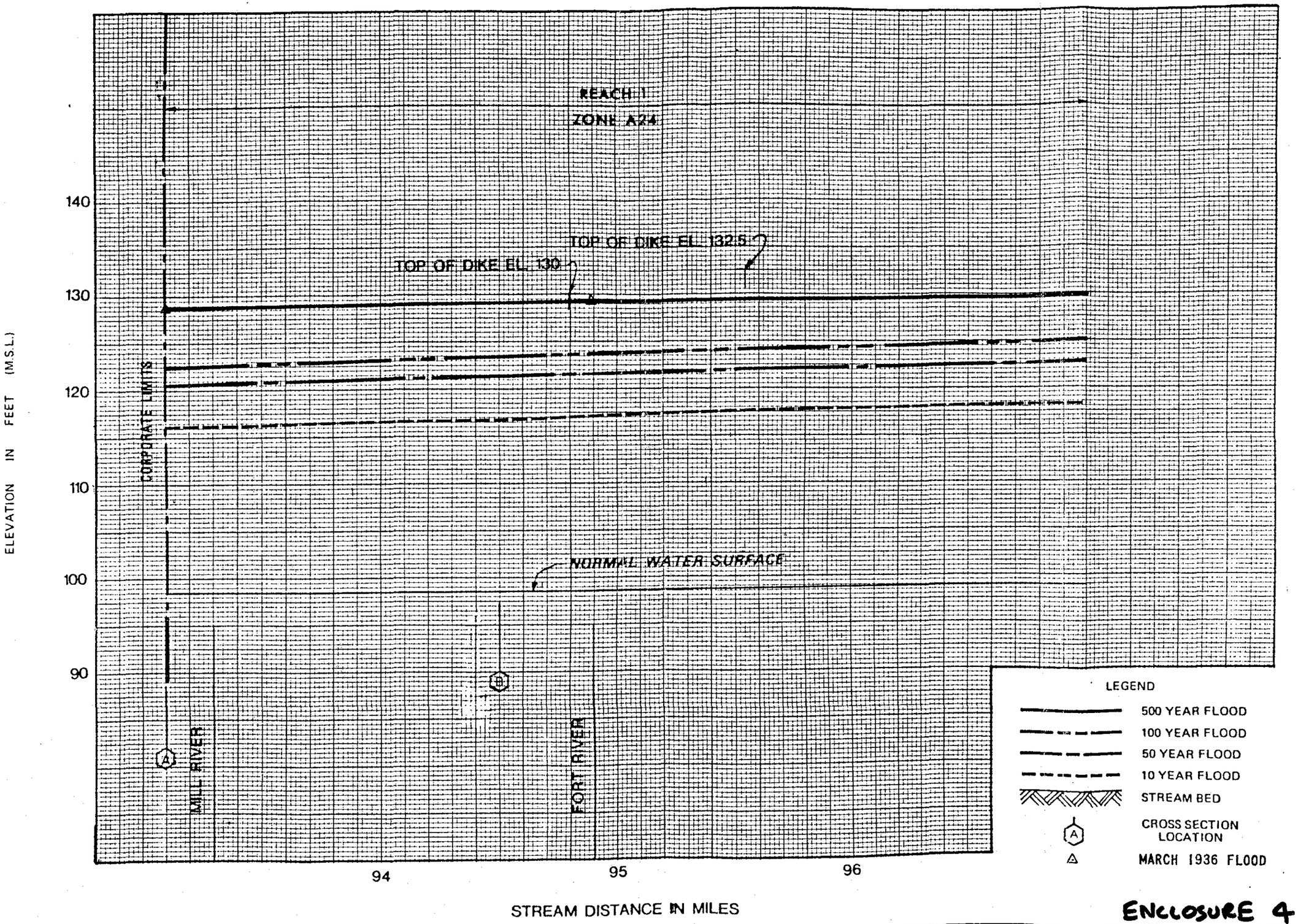
LOCAL PROTECTION PROJECT

PLAN-TYPICAL SECTIONS

NOT TO SCALE

NEW ENGLAND DIVISION WALTHAM, MASS.

ENCLOSURE 3



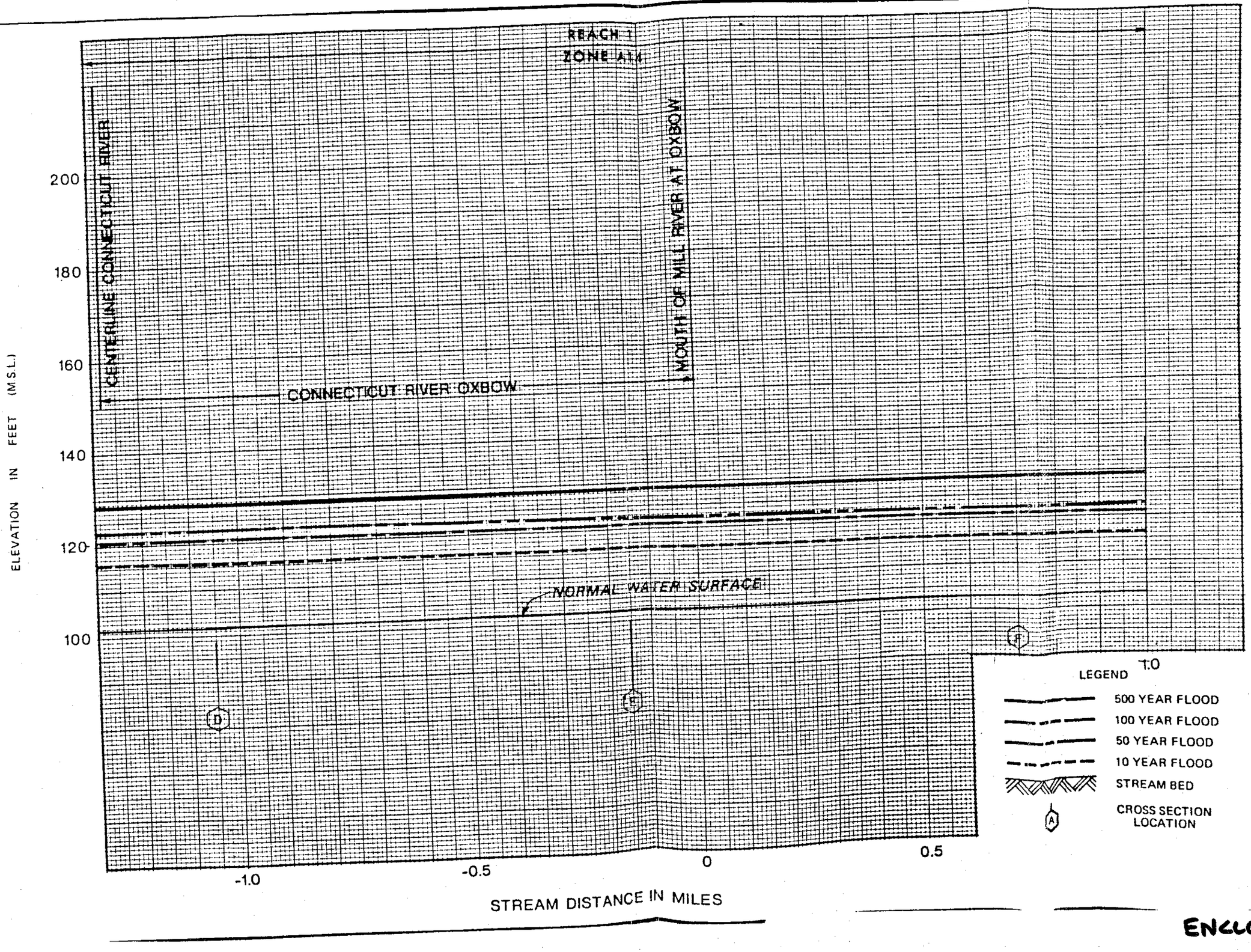
FLOOD PROFILES

CONNECTICUT RIVER

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

NORTHAMPTON, MA
(HAMPSHIRE CO)

ENCLOSURE 4



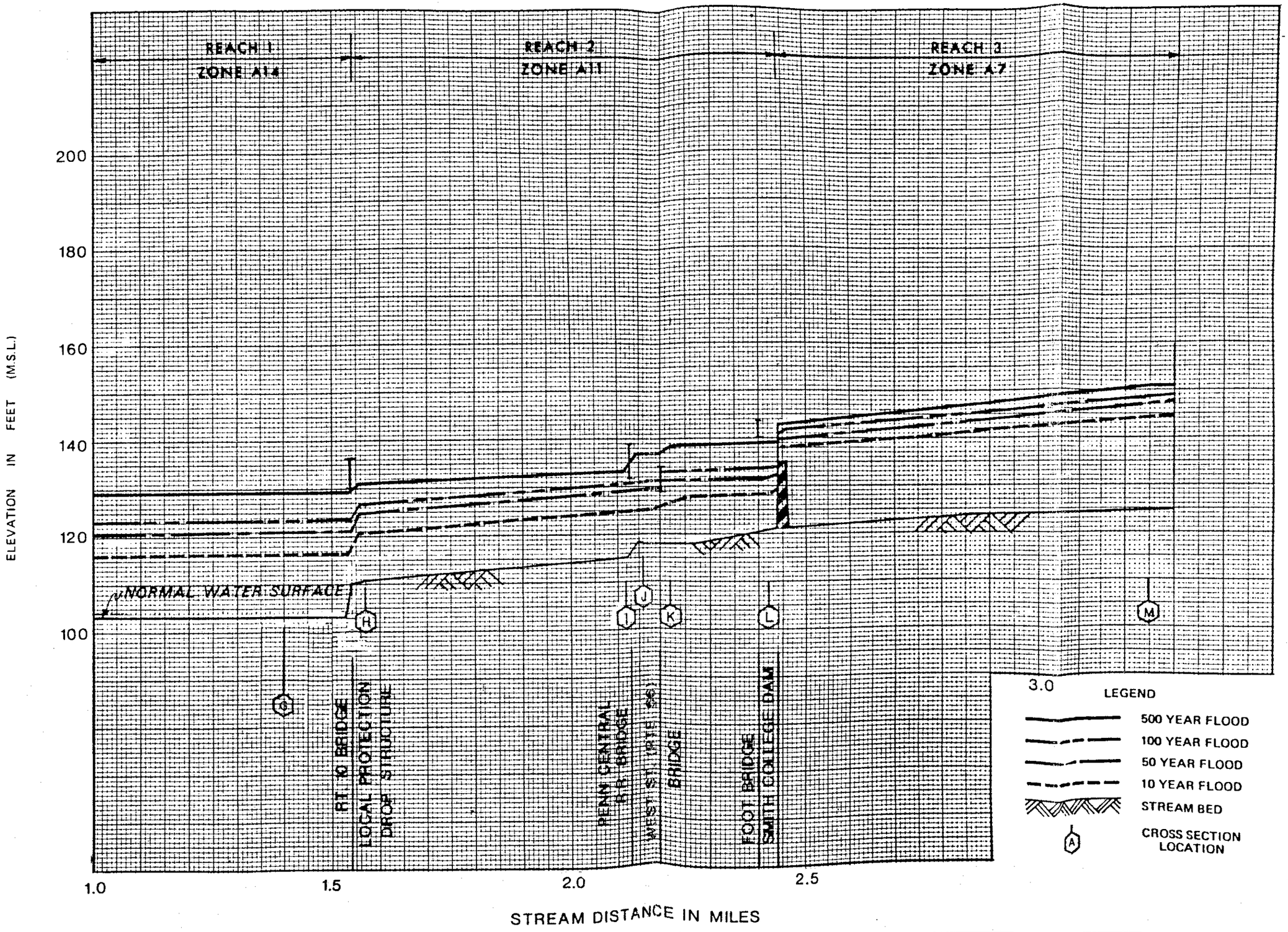
FLOOD PROFILES

MILL RIVER

DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

NORTHAMPTON, MA
(HAMPSHIRE CO.)

ENCLOSURE 5



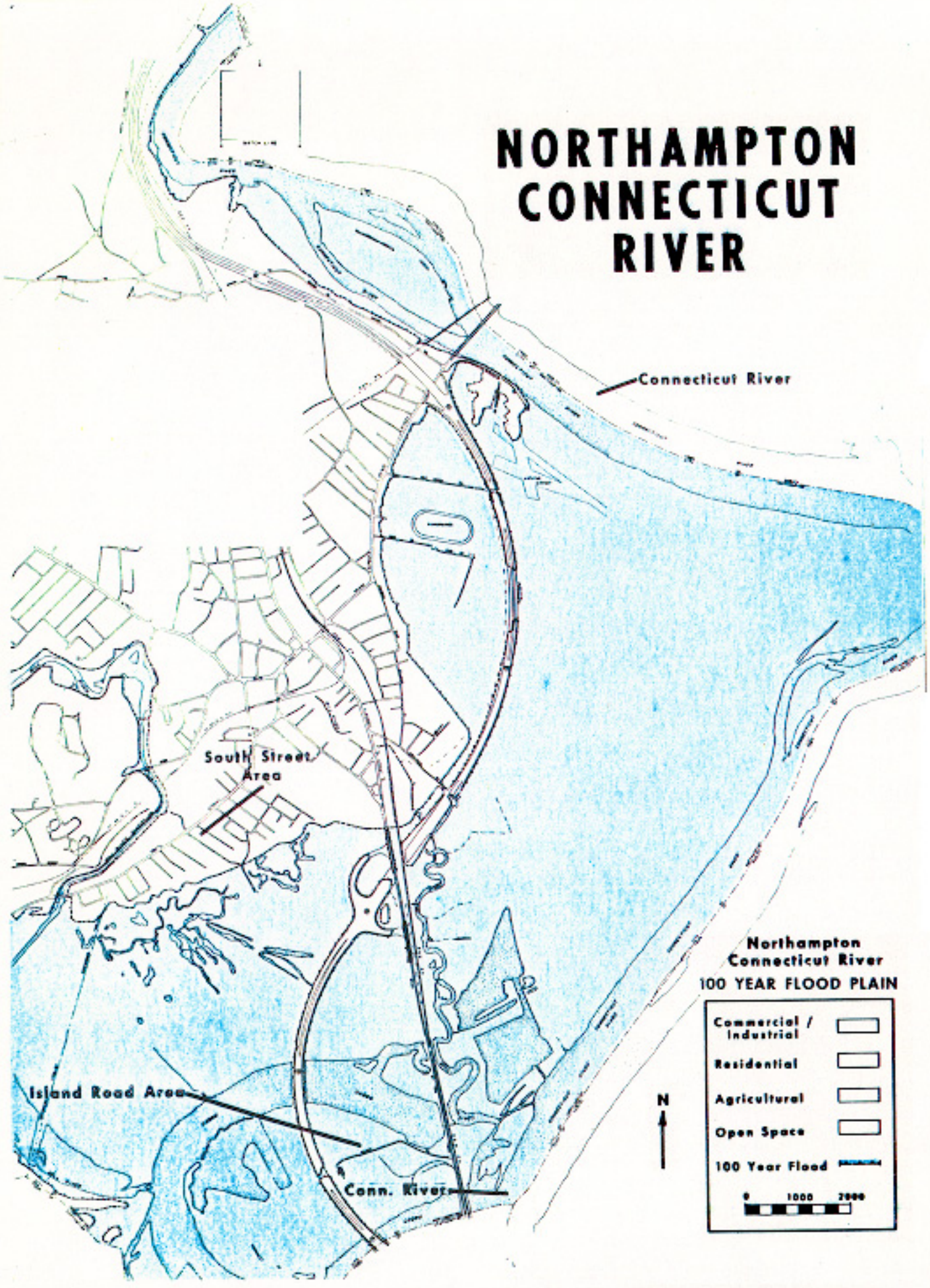
FLOOD PROFILES

MILL RIVER

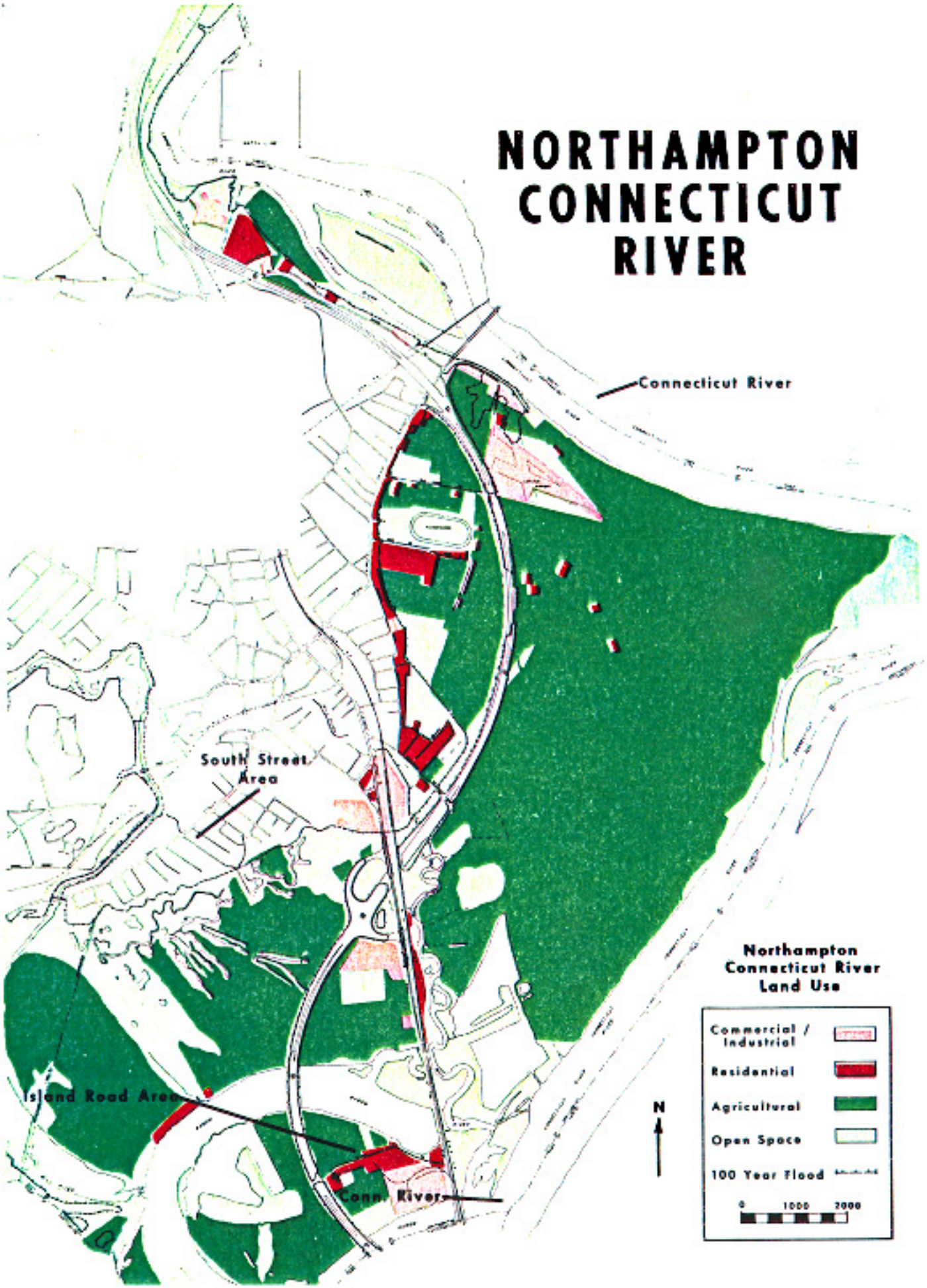
DEPARTMENT OF HOUSING AND URBAN DEVELOPMENT
Federal Insurance Administration

NORTHAMPTON, MA
(HAMPSHIRE CO.)

ENCLOSURE 6


NORTHAMPTON
CONNECTICUT
RIVER
Connecticut River
South Street
Area
Island Road Area
Conn. River
Northampton
Connecticut River
100 YEAR FLOOD PLAIN
Commercial /
Industrial
Residential
Agricultural
Open Space
100 Year Flood
0
1000
2000
N

ENCLOSURE 7


NORTHAMPTON
CONNECTICUT
RIVER
Connecticut River
South Street
Area
Island Road Area
Conn. River
Northampton
Connecticut River
Land Use
Commercial /
Industrial
Residential
Agricultural
Open Space
100 Year Flood
0
1000
2000
N

ENCLOSURE 8